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ABSTRACT

The paper discusses curriculum materials and learning strategies suitable to the right hemisphere of the brain. Two limiting factors are noted--the difficulty in identifying non-pathological Ss who show right brain tendency, and asymmetry of the brain which makes empirical evaluation of the validity of these materials problematic. The paper suggests that materials and methods may be combined in a deliberate focus on the methods of intelligence. Geometric problem activities are described which are pattern oriented and therefore appropriate to the right brain. Examples are provided of fitting problems (including the Tangrams in which a square is divided into seven smaller pieces), cutting problems (such as problems involving the simple cutting of regular figures into parts of equal area), and geometrical problems. Linguistic problems discussed include use of open-ended problems in which concepts become patterns and individual words become the elements. It is suggested that such learning strategies will be helpful for students who show right brain dominance as well as for those who otherwise appear to show little propensity for right brain activities. (CL)

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Learning Activities for the Right Brain

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Learning Activities for the Right Brain

Introduction

The selection of curriculum materials and learning activities for elementary and secondary students is no mean task. Throughout history, debate has continued over what should be taught and how it should be taught. Several conditions have influenced this debate, not the least of which is the nature of the human brain. Despite all the rhetoric, however, the traditional role of the school has been in the cognitive domain Further, the dominant factor in the cognitive domain has been the left hemisphere of the brain. The affective and psychomotor domains of education and the right side of the brain have not been completely ignored in our schools, but the other two areas of education and the "other" side of the brain have not been as important in the classrooms of America. Obviously, the cognitive, affective and psychomotor domains of learning can not be artifically separated, nor can the influence of the right hemisphere of the brain be separated from that of the left. [1] Still, until recently, the right brain has not received nearly the attention the left brain has.[2]

The purpose of this paper is to propose curriculum materials and learning strategies which are more suitable to the right hemisphere of the brain than to the left. At this time, no attempt will be made to suggest ways of integrating these materials and methods into existing curriculums. Nor is there any attempt yet to discuss their pratical applications in the classroom. That will be a later phase of this work. This paper suggests that there are materials and appropriate learning

strategies that can be considered for use by students that will enhance the activities of the right hemisphere of the brain. Despite these limitations placed on this discussion, this is still no easy task. Even though there are certain characteristics of the right brain that can be fairly well identified and even though there may be students who have at least a propensity for right brain activity, if not right brain dominance, an adequate evaluation of the effectivness of these materials will be difficult at best.

There are at least two factors which must be considered in the selection and eventual testing of these materials and methods. First, an attempt to identify non-pathological subjects who show right brain tendency is difficult.[3] The nature of handedness is certainly too crude a measure to adequately differentiate hemispherical propensity. Left handed people may well have a tendency for right brain activity, but this alone is not conclusive enough to use for identification.[4] In addition, even though there are several tests for creativity which have been developed since creativity was first "discovered" several years ago, (the right brain is supposed to be the creative side) neither can these tests alone provide the needed reliability to identify hemispherical activity.[5] Finally, one of the more promising measures which may provide some hope for differentiating between left and right brain activities is the Kaufman Assessment Battery for Children. In this test, there are subtests which evaluate for sequential processing as well as simultaneous processing (Kaufman, 1983). The Kaufman ABC promises to be useful in identifying students when we begin to test our proposed materials and methods.

A second limiting factor in this project is found in the brain's ability to lateralize. Shifting activities between the hemispheres makes it difficult to identify precisely which side of the brain is dominant, or at least "processing" at any given time.[6] Except for brain damaged subjects, as in strokes or accidents, this asymmetry of the brain makes empirical evaluation of the validity of these materials a difficult task.[7] Because of this factor alone the activities which we propose are only suggested as suitable for the right brain until further work can be done. In short, it is the hypothesis of this paper, that the materials and methods proposed will be suitable for the development of right brain activities in students with right brain dominance as well as in students who are apparently lacking in such asymetry. One additional factor relating to lateralization is found in the fact that these materials are of a problem solving nature and brain activity of this type becomes a much more complicating factor than it is in a lower level of brain fuction (Philips and Mazziotta, 1981).

Several assumptions are made in selecting these activities. First, problem solving activity in the normal brain is not limited to one hemisphere alone. Rather, problem solving is a function of both hemispheres with lateralization at different stages in the solution of the problem.[8] A second assumption is that the right hemisphere of the brain is much more oriented to patterns and pattern recognition whereas the left brain is more oriented toward elements and their sequential organization.[9,10] Thirdly, right brain activities do exist in "normal" children and they are to some degree age related.[11] Finally, brain asymetry is differentiated more

among some children than others.[12]

One basis for the combination of these materials and methods together into learning strategies comes from the work of Dr. Paul Brandwein. He relies heavily upon a concept called the "Methods of Intelligence" as appropriate to the methods of learning. This is of course not new. Throughout human intellectural history, people have used these methods of intelligence in their work and in their lives. Brandwein proposes that our schools become more deliberate in the use of these methods of intelligence. Central to this thesis is Branwein's dictum that "The concept is inerent in the corresponding operation."[13] It is on this thesis that these proposed materials and methods are based.

The reminder of this paper will present several types of materials, or classes of problems more suitable to the right brain. They will concentrate on the lateralized abilities of the right brain as opposed to those of the left brain. In addition, some of the characteristics of these learning strategies will be presented which have been successful. Most of these materials and methods await further empirical study, but it is important that these classes of materials be discussed. No attempt is made to identify specific instructional objectives, nor to propose where these materials will fit into any curriculum. This will come later. At this point the intent is to present these materials that appear to be more appropriate to the right hemisphere of the brain.

Geometric Problem Activities

There are basically two groups of materials which are more pattern

oriented and therefore more appropriate to the right brain. The first of these is a group of geometric problems that are not necessarily solved by deductive logic alone. Deduction may well play a role, but more important is the element of "insight" for the solution. Martin Gardner in his book Aha! Insight has alluded to this type of problem solving (Gardner, 1981). First, the elements of the probmem are encompassed and when the appropriate pattern emerges, the solution of the problem becomes clearer.

Fitting Problems

The first of these can be called the "fitting" problems. Numerous examples of these exist, but one of the more famous, and the one which has been the most successful in our work is the Tangrams. This is a square, divided into seven smaller pieces, Figure 1. The pieces are than taken and fitted

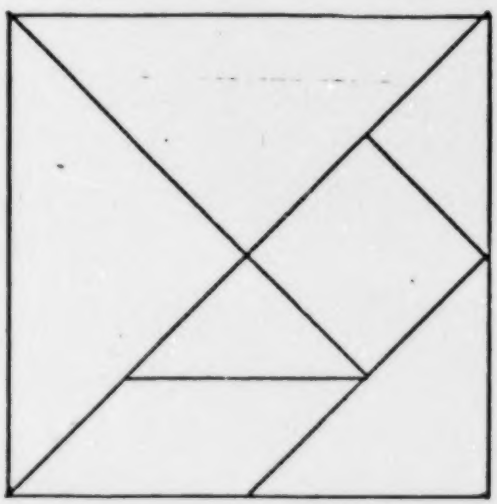

Figure 1. Tangrams

together into certain specific shapes. Until recently, these shapes were usually of the representational type, Figure 2.

The validity of forming tangrams into running boys, ships, trees. etc. is not in question. Rather, the application of the tangrams to specific geometric shapes has provided an opportunity for more articulated right brain activity.

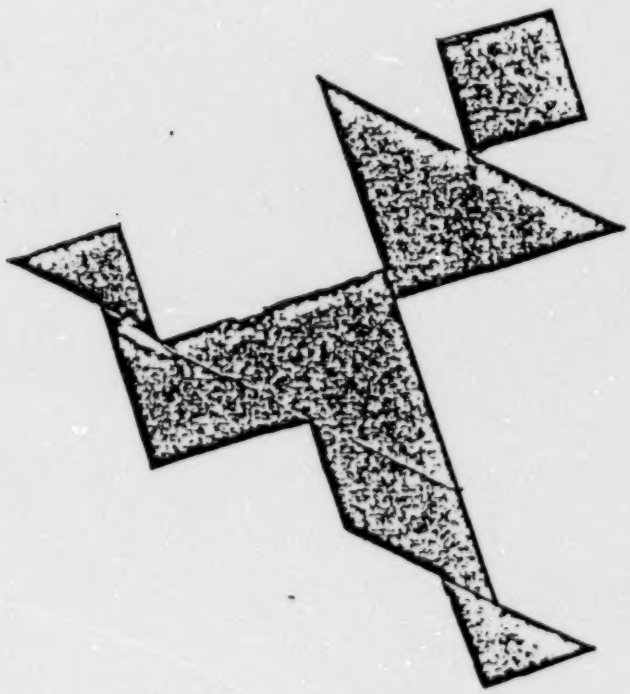

Figure 2. Fitting tangrams into representation figures; running boy.

The student is given some or all seven of the pieces and instructed to fit them together into a geometric shapes such as rectangles, triangles etc. In addition, the student is also asked to fit the pieces together to form irregular polygons, and finally, paradoxes, - Figures 3 & 4.

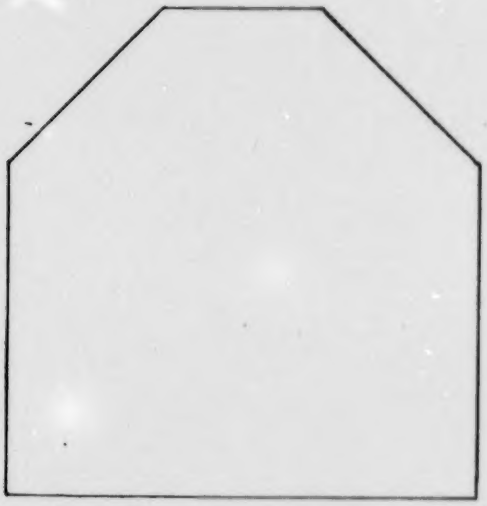

Figure 3. Irregular polygon for fitting tangram pieces.

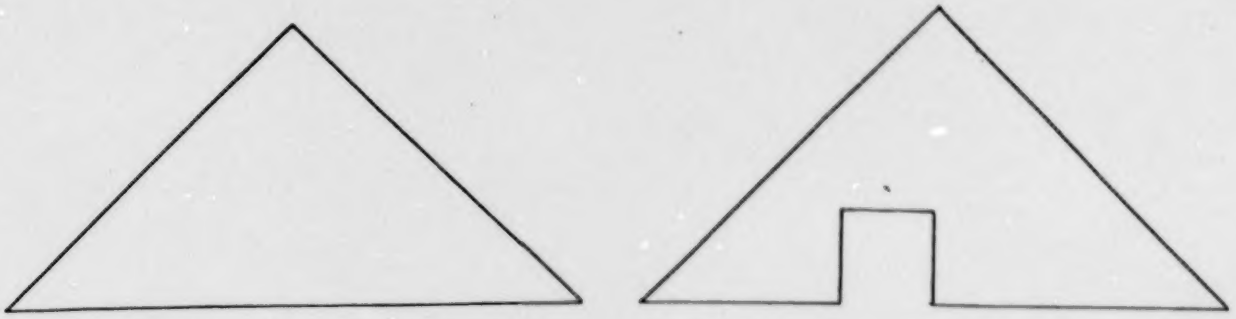

Figure 4. Tangram paradox. The seven pieces are to be fitted together to form a triangle and then be rearranged to form another triangle, slightly larger with a space the size of one piece missing.

Alone, these tangrams might be suitable for classroom use. However, with the appropriate learning strategies they can become much more viable activities for students from kindergarden to twelth grade. Time nor space do not allow a complete description of all aspects of the methods which have been found useful with this set of materials. However, there are some generalizations which we have found. First, in using materials such as these, the student must accept more responsibility for actively participating and the teacher must minimize student's "idle" listening periods. Secondly, the communication between the student and teacher must minimize the oral-aural channels. Third, more success is found in the use of these materials if they are presented to the student in a sequential manner, fewer pieces and simple shapes to more pieces and more complex shapes. Finally, for the lower grades real size figures are much more suitable than reduced size. These four genaralizations are certainly over simplified, however, we have found that when students follow these elements in the learning strategies, not only are those with a right brain tendency able to successfully complete some of the more complex figures, so are the children who do not otherwise show mathematical ability or right brain propensity.

Another type of fitting problem is the polyominoes. A commercial form of this is the pentomino game which has also been adapted to a computer program (Butterfield, 1984). This class of problems begins with unit square, the monomino and progresses through the domino, the tromino, etc, with various combinations of unit squares. Even though we have found useful examples of specific heptomonoes, the practical

limit for classroom activities seems to be the hexomonoes. Our work has not yet developed appropriate learning strategies for these materials but some of the more preliminary work shows promise. Figure 5 shows and example of this class of problem.

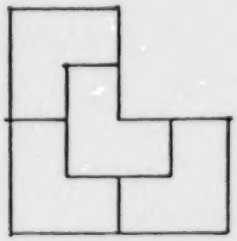

Figure 5. Four right angle trominoes fitted together to form a larger right angle trominc.

A third type of fitting problem is found when an existing figure, usually a regular polygon, is to be cut into a specified number of pieces with the stipulation that the resultant pieces must be fitted together to form other figures. Figure 6 is one example of this type of problem. This example certainly has a mathematically trivial solution, but it is a good example of the types of problems in this class that have been found useful in some of the upper elementary classrooms. The little work we have done with this type of problem has also confirmed the proposed learning strategies already mentioned.

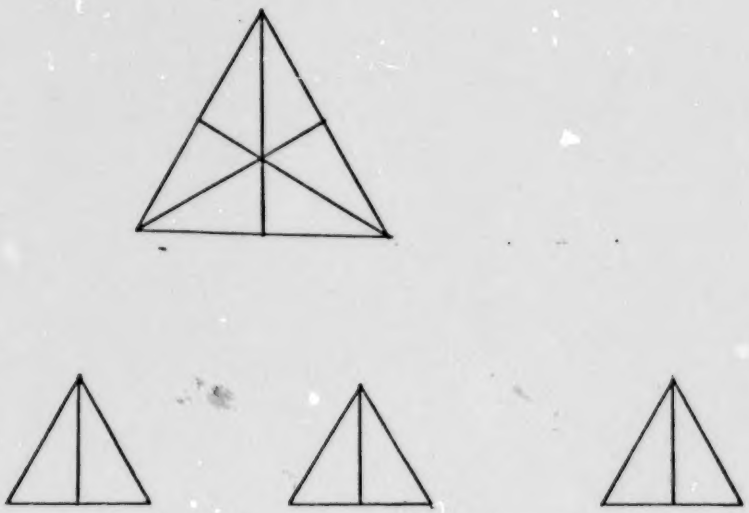

Figure 6. An equilateral triangle cut into six pieces which are then fitted together to form three smaller equilateral triangles.

Leaving fitting problems and moving to a class of problems known as cutting problems, this class of activities has also been found appropriate to the right brain. The first of these is the simple cutting of regular figures into parts of equal area, Figure 7. Because of the

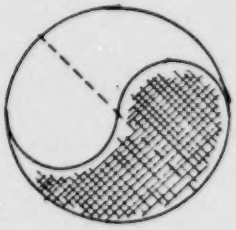

Figure 7. The traditional Ying Yang figure divided into equal areas by one straight line.

simplicity of this type of activity, the more suitable group of materials for upper elementary and secondary classrooms is found in cutting such figures into pieces of equal size and shape. Commonly called the congruent halves problems. Figure 8 shows an example of this type of problem. Currently under development is a learning strategy for using this latter type of cutting problem. An interesting sidelight of this type of learning activity is found in Figure 8

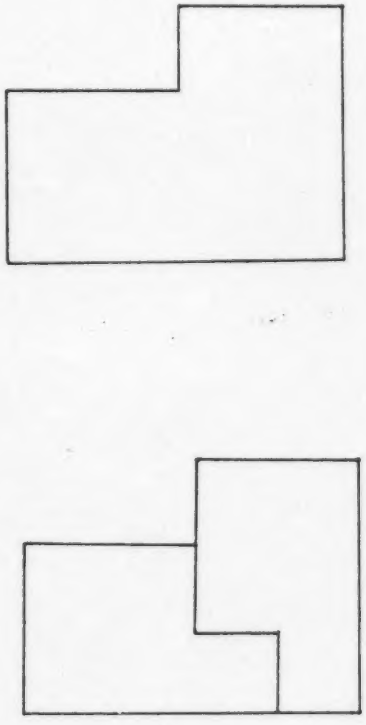

Figure 8. Divide the top figure into congruent halves.

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where this also becomes a fitting together of two "block" pentominoes.

Leaving both the cutting and fitting problems another class of learning activities is the sliding block puzzles. Most commonly found is the "15" puzzle, where a four-by-four matrix has fifteen small blocks numbered and the student is to slide them around to certain numerical sequences. These are not always the most useful for the type of activity for the right brain. Instead, there is a group of activities where different shaped blocks are placed in a box of specified size and by sliding with no lifting, one of the bolcks is to be moved elsewhere in the box. Figure 9 shows the arrangement of the nine block puzzle and shows where the square block is to be moved. In using these activities in the elementary classrooms, students have reacted at first by saying,

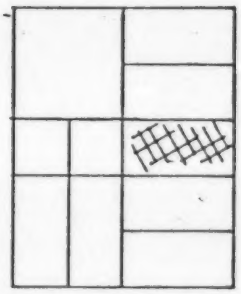

Figure 9. The nine block puzzle. The pieces are to slide within the confines of the "box" so that the large square is brought to the lower right hand corner.

"That's impossible." With the appropriate strategies which we have discussed, the student is soon able to solve some of the more complex activities of this type.

There are two final groups of activities which can be classified as geometrical in nature. Both show promise, but we have little experience with these in the classroom. The first of these is the dot problems. One of the better known dot problems is shown in Figure 10. However, more useful for the type of learning activity which we propose is found in Figure 11.

Figure 10. One and only one line is to be drawn through each dot without raising the pencil.

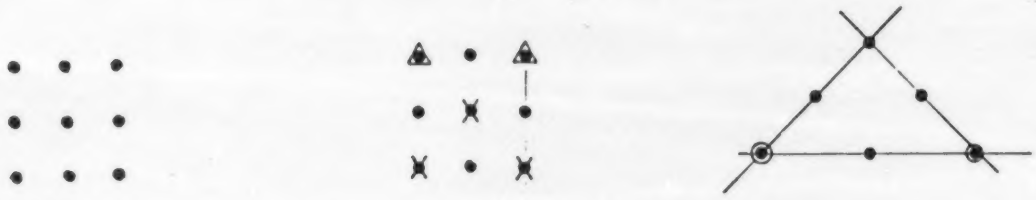

Figure 11. Remove three dots from the nine dot matrix and move two others so that three rows are formed with three dots each.

In this latter type an arrangement of dots is given and then a specified number are to be moved and/or removed to obtain a new configuration. In this new configuration lines are to be drawn with a specified number of dots in each line. So far we have done little work in this type of problem, but it is clear that these will be for secondary classrooms at best.

The final group of problems is the matchstick problems. Or in this day when fewer are smoking, the toothpick problems. Similar to the dot problems, a configuration of toothpicks is established and then by moving and/or removing a specified number of toothpicks a new configuration is obtained Figure 12. These problems also can be quite difficult and we propose to apply to them the same learning strategies already discussed.

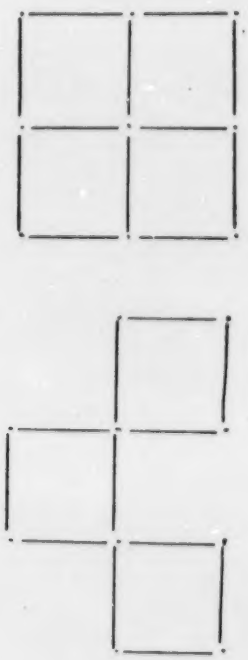

Figure 12. Move three toothpicks in the top figure to form the bottom figure.

Linguistic Problems

The question may legitimately be asked, "How can language activities be considered for right brain activity when it has been documented that language is primarily a left brain activity?" There are at least two answers. First, even though language may well be primarily a left brain function,[14] lateralization often involves the right brain in language activities.[15] The degree of lateralization is not the question here, the fact that the right brain is involved in language gives us reason to consider language as an area to apply our learning strategies. Secondly, one of the original premises of our work, that patterns and pattern recognition are more of a right brain function, can be appiled to language activities and therefore, the right brain may become an integral part of these "left brain" domain activities.

We have done very little in the development of these materials, however, one strategy which has proved useful is based on Edward deBono's work in open-ended problems.[16] In this he proposes an open-ended problem where twelve words are given and they are to be grouped in several different ways. Six concepts are to be chosen and two of the twelve words are to be assigned to each concept which are appropriately encompassed by that concept. Then, four concepts are to be chosen and three words each are assigned. Next, three concepts are chosen and four words each assigned. Finally, two concepts are chosen and six words each are appropriately assigned.

Fitting this strategy into a right brain activity involves the concepts becoming the patterns and the individual words becoming the elements. Once the two components are combined the right brain becomes

a viable part of the strategy that involves language activities. Clearly, for an instructional process, the choice of the original twelve words becomes critical.

We have used this learning strategy, which is stated in problem form, and applied it to both learning and evaluation in several different subject areas, grade levels and in a cross-cultural context. In a program with the Universtiy of Chiapas, Mexico, this learning strategy was found to be a viable method of instruction. There may be come concern that this learning strategy as well as others which we have proposed are so heavily dependent upon the problematic nature of knowledge. We have considered this and there are several bases for our continuing to rely upon problems so heavily, but the twelve word strategy offers one of the best examples of how a problem can be developed into both instruction and evaluative processes.

Several other types of language materials which appear to have some promise, but the twelve word strategy is the only one that is sufficiently developed to present at this time.

Conclusion

Even though the work we have done in this area is only in the begining stages, it appears that there is sufficient reason to pursue it further. The next phase is to develop our materials further and begin empirical tests. As difficult as this may be, there appears to be promise that these learning strategies will be useful for students who show right brain dominance as well as students who otherwise appear to show little propensity for right brain activities.

Reference Notes

1. Springer, S.P. & Deutsch, G. Left Brain, Right Brain, San Francisco, W. H. Freeman & Co., 1981, 53.
2. Ibid., 13.
3. Ibid., 21-22.
4. Ibid., 17.
5. Crockenberg, S.B., "Creativity Tests; Boon or Boondoggle for Education?" Review of Education Research, Winter 1972, 42, (1) 36-38.
6. Segalowitz, S.J., Two Sides of the Brain; Brain Lateralization Explored, Englewoods Cliffs, New Jersey, Prentice-Hall, Inc., 1983, 82-83
7. Springer, op. cit., 74-76.
8. Hyman, R. & Anderson., B., "Solving Problems" International Science and Technology, September 1963, 1445.
9. Segalowitz, op. cit., 104.
10. Springer, op. cit., 14.
11. Segalowitz, op. cit., 111.
12. Restak, R.M. "Brain Potential; Signaling our Thoughts" Psychology Today March 1979 12 (10), 49-50.
13. Brandwein, P., "Science; The Consequences of Success" Keynote Address, 24th Edison Foundation Science Institute Birmingham, Alabama, Science and Man-Opportunities and Challanges, Typed Manuscript, January 1972, 20-21, 6.
14. Segalowitz, op. cit., 85-86
15. Ibid ., 114-115
16. de Bono, E., "Playback 17" Science Journal, May 1970, 35.

References

Brandwein, P., "Science; The Consequences of Success" Keynote Address, 24th Edison Foundation Science Institute, "Science and Man-Opportunities and Challenges" Birmingham, Alabama, January 20-21, 1972, Typed manuscript, 9p.

Butterfield, J. "Pentominos! A Problem Solving Program" Compute, May 1984, (5), Issue 48, 106+

Crockenberg, S.B., "Creativity Tests: Boon or Boondoggle for Education?" Review of Educational Research, Winter 1972 42 (1) 27-45.

de Bono, E., "Playback 17" Science Journal, May 1970, 35-36.

Gardner, M., Aha! Insight, New York, Freeman, W.H. & Co., 1978 179p.

Hyman, R. & Anderson, B. "Solving Problems" International Science and Technology, September 1963, 1445-1446.

Kaufman, A.S. & Kaufman, N.L., Kaufman Assessment Battery for Children, Circle Pines, Minnesota, American Guidance Service Inc. 1983.

Phelps, M. & Mazziotta, J.C., "Metabolic Mapping of the Brain's Response to Visual Stimulation; Studies in Humans" Science 211, (4489) March 27, 1981, 1445-1448.

Restak, R.M., "Brain Potentials, Signaling our Inner Thoughts", Psychology Today, March 1979, 12, (10) 42-54+

Segalowitz, S.J., Two Sides of the Brain; Brain Lateralization Explored, Englewood Cliffs, New Jersey, Prentice-Hall, Inc., 1983, 292p.

Springer, S.P. & Deutsch, G., Left Brain, Right Brain, San Francisco, Freeman, W.H. & Co.,1981, 243p.